

Pg. 21, line 9, change "safely" to --safety--.  
Pg. 21, penultimate line, delete ";", insert --;--.  
Pg. 23, line 12, change "pull out" to --pullout--.

### IN THE CLAIMS

Amend claims 1 and 4 as rewritten below.  
Cancel claim 5 without prejudice.  
Claim 6, line 1, change "trailing edge" to --rearward end--.  
Claim 7, line 5, change "trailing edge" to --rearward end--.  
Claim 9, line 11, change "vehicle" to --elongated body--.  
Amend claims 13 and 16 as rewritten below.  
Cancel claims 17 and 18 without prejudice.  
Amend claim 19 as rewritten below.  
Cancel claims 20-24 without prejudice.  
Add new claims 40-52 as written below.

#### 1. (once amended)

A surface and subsurface operational watercraft having an elongated body with a forward end and a rearward end, said watercraft being further characterized in having:

- a) A weight and a power means;
- b) Said elongated body having a planform which is generally triangular with a narrow end forward [planview with a narrow portion adjacent said forward end] and a broader portion adjacent said stern with said elongated body when floating in static water having a first submerged volume with a profile in side view which is generally a long triangle with base adjacent said forward end and a narrow end adjacent said rearward end;
- c) Said elongated body having right and left lateral wings;
- d) Said watercraft [vessel] being capable of operating in, at and below the surface of water;
- e) Said [vessel when floating static in water having a] first submerged volume generating an upward buoyant force equal to the weight of said watercraft, with said elongated body having

a [vessel and a] second volume above said first volume sufficient to permit surface operation of said watercraft [vehicle] with a significant positive reserve buoyancy margin;

f) Said watercraft [vessel] being capable of moving forward in water under the action of said power means in an efficient and sustained manner;

g) Said wings being at least partially submerged when said watercraft [vessel] is operating at the surface of water at a dive speed;

h) Said wings at said dive speed operative to generate said [a] downward hydrodynamic force sufficient to overcome the upward buoyant force of said positive reserve buoyancy [buoyance] margin when submerged;

i) Said wings at a submerged speed operative to generate a downward hydrodynamic force sufficient to counter the lifting forces generated by said second volume when submerged;

j) Whereby said vessel can operate submerged in an efficient and sustained manner.

**4. (once amended)**

The watercraft of claim 1 further characterized [in which]:

a) Said broader portion adjacent said stern has a broad beam in planview forming the trailing edge of said elongated body;

b) In that the combined profile shape of said first and second volumes adjacent said rearward end [broader portion] tapers in side view smoothly in a rearward direction with upper and lower surface portions meeting at said rearward end [trailing edge].

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3 **13. (once amended)**

4 The watercraft of claim 6 [5] in which said trailing edge flaps [on said elongated body] and  
5 said wings are adapted to be moved in coordinated fashion to accomplish pitch and path control, with  
6 the trailing edge of said flap [of said elongated body] moving in opposite direction to the trailing  
7 edges of said wings.  
8

9 **16. (once amended)**

10 The watercraft of claim 1 in which the area of said wings is no less than the area obtained by  
11 dividing [a quantity equal to approximately] the buoyant force generated by [on] said second volume  
12 when submerged by the product of the dynamic water pressure in said submerged speed [motion]  
13 times a non-dimensional number no less than approximately 0.3 [0.4] and no greater than  
14 approximately 1.6.  
15

16 **19. (once amended)**

17 The watercraft of claim 4 [15] in which the profile view of said second volume [a portion of]  
18 said elongated body above water level is approximately a long triangle [triangular] with long base  
19 at waterplane [and opposite sides upwards].  
20

21 AMENDED CLAIMS IN PRINT-READY FORMAT  
22

23 **1.** A surface and subsurface operational watercraft having an elongated body with a  
24 forward end and a rearward end, said watercraft being further characterized in having:  
25

26 c) A weight and a power means;  
27  
28

- 1 d) Said elongated body having a planform which is generally triangular with a narrow end  
2 forward and a broader portion adjacent said stern with said elongated body when floating in  
3 static water having a first submerged volume with a profile in side view which is generally  
4 a long triangle with base adjacent said forward end and a narrow end adjacent said rearward  
5 end;  
6
- 7 e) Said elongated body having right and left lateral wings;  
8
- 9 f) Said watercraft being capable of operating in, at and below the surface of water;  
10
- 11 g) Said first submerged volume generating an upward buoyant force equal to the weight of said  
12 watercraft, with said elongated body having a second volume above said first volume  
13 sufficient to permit surface operation of said watercraft with a significant positive reserve  
14 buoyancy margin;  
15
- 16 h) Said watercraft being capable of moving forward in water under the action of said power  
17 means in an efficient and sustained manner;  
18
- 19 i) Said wings being at least partially submerged when said watercraft is operating at the surface  
20 of water at a dive speed;  
21
- 22 j) Said wings at said dive speed operative to generate said downward hydrodynamic force  
23 sufficient to overcome the upward buoyant force of said positive reserve buoyancy margin  
24 when submerged;  
25
- 26 k) Said wings at a submerged speed operative to generate a downward hydrodynamic force  
27 sufficient to counter the lifting forces generated by said second volume when submerged;  
28

1  
2 l) Whereby said vessel can operate submerged in an efficient and sustained manner.

3  
4 4. The watercraft of claim 1 further characterized:

5  
6 a) Said broader portion adjacent said stern has a broad beam in planview forming the trailing  
7 edge of said elongated body;

8  
9 b) In that the combined profile shape of said first and second volumes adjacent said rearward  
10 end tapers in side view smoothly in a rearward direction with upper and lower surface  
11 portions meeting at said rearward end.  
12

13  
14 13. The watercraft of claim 6 in which said trailing edge flaps and said wings are adapted  
15 to be moved in coordinated fashion to accomplish pitch and path control, with the trailing edge of  
16 said flap moving in opposite direction to the trailing edges of said wings.  
17

18 16. The watercraft of claim 1 in which the area of said wings is no less than the area  
19 obtained by dividing the buoyant force generated by said second volume when submerged by the  
20 product of the dynamic water pressure in said submerged speed times a non-dimensional number no  
21 less than approximately 0.3 and no greater than approximately 1.6.  
22

23 19. The watercraft of claim 4 in which the profile view of said second volume said  
24 elongated body above water level is approximately a long triangle with long base at waterplane.  
25

26 NEW CLAIMS  
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28

1 40. A surface and subsurface operational watercraft having an elongated body with a  
2 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a  
3 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward;  
4 said elongated body further characterized in having in sideview when submerged a total height  
5 adjacent said forward end which is substantially less than the total planform width of said body  
6 adjacent said rearward end.

7  
8 41. The structure of claim 40 in which said total height is no greater than approximately  
9 half said total width.

10  
11 42. A surface and subsurface operational watercraft having an elongated body with a  
12 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a  
13 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward;  
14 said elongated body further characterized in having in sideview when submerged, an overall height  
15 located adjacent the middle of said body.

16  
17 43. A surface and subsurface operational watercraft having an elongated body with a  
18 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a  
19 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward;  
20 said elongated body further characterized ink that the included angle in profile of said rearward end  
21 is approximately twice the included angle in planview of said forward end.

22  
23 44. The structure of claim 40 further characterized in that said elongated body has lateral  
24 right and left wing panels.

25  
26 45. The structure of claim 40 further characterized in that said rearward end of said  
27 elongated body has upper and lower surfaces portions joined in an athwarship rearward border, and  
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1 in that a movable control surface is mounted on said rearward border.

2  
3 46. A surface and subsurface operational watercraft having an elongated body with a  
4 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a  
5 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward, said  
6 watercraft further characterized in having an overall streamlined external surface envelope of said  
7 elongated body with a total body volume; a primary interior dry volume having a structural midbody  
8 portion capable of supporting external water pressures when submerged; and a secondary interior  
9 volume adjacent said narrow ends which is adapted to be flooded during submerged operation to  
10 equalize pressures between water outside and inside said external envelope in said secondary  
11 volume.

12  
13 47. The watercraft of claim 40 further characterized in that said elongated body is adapted  
14 to be aid-dropped from an aircraft, with a parachute connected adjacent said rearward end,  
15 establishing an approximately steady decent rate with said forward end pointing towards a water  
16 body.

17  
18 48. The watercraft of claim 40 further characterized in that said elongated body is adapted  
19 for land operation with a retractable tricycle wheel arrangement.

20  
21 49. The watercraft of claim 40 further characterized in that said elongated body is adapted  
22 to move across a large wave with a transient submerged path below the top of said wave.

23  
24 50. A surface and subsurface operational watercraft having an elongated body with a  
25 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a  
26 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward;  
27 said elongated body having a principal surface envelope portion above water when in surface  
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1 operation comprised by several flat panels oriented in and approximately streamlined disposition.

2  
3 51. A surface and subsurface operational watercraft having an elongated body with a  
4 forward end which is approximately wedge-shaped in planview with its narrow end forward, and  
5 a rearward end which is approximately wedge-shaped in profile view with its narrow end rearward;  
6 said watercraft further characterized in having a powerplant capable of imparting a forward thrust  
7 approximately parallel to the long dimension of said elongated body, with said watercraft being  
8 adapted to be released above a water surface with said forward end in an approximately downwardly  
9 direction, with said forward thrust being active when said forward end penetrates said water surface.

10  
11 52. The structure of claim 44, further characterized in that said wings are adapted to be  
12 moved from a deployed position protruding laterally from said elongated body, to a retracted position  
13 in which at least a substantial portion of said wings are positioned in close proximity to said  
14 elongated body in a streamlined disposition.

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16  
17 REMARKS

18 Reexamination of this application is respectfully requested.

19 The antecedent basis and the indefiniteness rejections of the first and second paragraphs of  
20 the office action are believed to have been resolved by amendments to the claims. Applicant further  
21 respectfully requests that he be permitted to delay correction of the drawings until such time as the  
22 present application is allowed. At that time, Applicants will submit corrected drawings. It is  
23 believed that the inclusion of the missing reference numerals and legends will resolve those  
24 informalities in the disclosure also.

25 On the allowability of original claims 1-19 as amended:

26 Claim 1 has been amended to incorporate in its subparagraph (b) all the limitations of claims  
27 17 and 18, thus becoming allowable in accordance to examiners action, page 3, item 11. Claim 1  
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